


March 27, 1969

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I am pleased to submit our proposed Statement of Work pertaining to the "Modification of Microdensitometer Digital Readout System".

Our fixed price proposal of  contemplates a total performance period of 65 days. We will need access to the machine 2 or 3 times during the program and we anticipate that installation and check out of the modifications will require a week.

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I trust this meets all of your requirements. If you have any questions, please contact me.

Sincerely,



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REW/zk

Declass Review by NIMA/DOD

## STATEMENT OF WORK

MODIFICATION OF MICRODENSITOMETER  
DIGITAL READOUT SYSTEM

## INTRODUCTION

This statement of work describes a proposed program to modify the [REDACTED]

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[REDACTED] Model 985 Microdensitometer Readout System. Two modifications are involved. The first will permit shorter and more accurate scan lengths than can presently be obtained. The second will permit a sampling rate of ten samples per micron.

## MODIFICATION OF SCAN LENGTH

Presently the minimum length of scan is limited by the physical size of the microswitches used to set the ends of the scan. We propose to use the coordinate counter to establish scan length. This should also provide a more accurate scan since the switch variations will be eliminated.

One end of the scan will be the zero coordinate. This requires that the operator move the carriage to the desired starting point and reset the appropriate coordinate counter at that point. The desired length of scan will then be set decimally in microns on six thumbwheel switches. Reversal of scan direction will occur when the coordinate counter reaches zero and when it reaches the set value.

To accomplish this will require the addition of six decimal switches, six decade counters and associated interfacing.

This modification will be usable on either the X or Y axis scans. The present SCAN AXIS switch will make this selection.

## INCREASED SAMPLING RATE

The present maximum sampling rate is one sample per micron. The purpose of this modification is to increase this rate to ten samples per micron. It should be noted that the present digital system has a maximum sample rate expressed in samples per

second. Increasing the number of samples per micron will then reduce the maximum scan rate. In three color operation, the maximum scan rate will be five millimeters per minute.

To accomplish this, we propose to provide a crystal controlled oscillator and divide the frequency down appropriately to give ten samples per micron. Since the stage is driven by a synchronous motor, the rate of travel is constant except during start and stop. On the assumption that the 60 cps power source is very nearly constant in frequency, the crystal controlled oscillator will then provide an essentially constant distance between samples. Our experience indicates that the 60 cps frequency is sufficiently stable. However some testing of this either before or after the modification should be performed. If instability of the power source should be a problem, power for the scan motors can be derived from the crystal oscillator. However, our present program does not include this.

Basically, this modification will consist of adding a crystal controlled oscillator and a frequency divider. The present equipment will then be changed as necessary. A switch will be provided to permit either the added sample signal generator to be used or to permit operation in the present manner. Also, a multiple position switch will be added so that a ten samples per micron signal can be obtained at all scan rates.

#### PROGRAM

It will be necessary for one man to visit the equipment early in the program in order to determine space available, necessary package configuration, etc. He may also find it desirable to make some electrical checks but primarily this visit is necessary for packaging reasons.

Modifications will then be designed and fabricated at [REDACTED]

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Installation will be performed by a [REDACTED] engineer. Complete check-out will follow installation.

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#### SCHEDULE

Modification units will be complete and ready for installation within sixty (60) days after the program is initiated. Installation and check-out will require one week.

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(When Filled In)

DATE

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1. PROJECT TITLE/CODE NAME  
Microdensitometer Modifica-  
tions (Scan Control and  
Sampling System)

2. SHORT PROJECT DESCRIPTION  
This project is to develop a digital scan controller  
and a time based sampling system for the [ ] 1032T  
Trichromatic Microdensitometer now in use at NPIC

3. CONTRACTOR NAME

4. LOCATION OF CONTRACTOR

5. CLASS OF CONTRACTOR  
Manufacturer

6. TYPE OF CONTRACT  
FP

7. FUNDS

8. REQUISITION NO.

9. BUDGET PROJECT NO.

FY 19 68 \$ None

FY 19 69 [ ]

10. EFFECTIVE CONTRACT DATE  
(Begin - end)

May 1969 - July 1969

11. SECURITY CLASS.  
AA - Confidential  
T - Unclassified  
W - Unclassified

FY 19 70 \$ None

12. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION

DDI/NPIC/TSSG/DED/[ ]

13. REQUIREMENT/AUTHORITY The [ ] 1032T Microdensitometer is limited in its ability to  
(a) scan microscopic areas of imagery without producing extraneous data and (b)  
analyze film imagery which exceeds 170 lines per millimeter in resolution.

14. TYPE OF WORK TO BE DONE

Engineering Development

15. CATEGORIES OF EFFORT

MAJOR CATEGORY

SUB-CATEGORIES

Precision Measurement

Microdensitometry  
Optical Systems

16. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC. The  
Contractor will modify the Microdensitometer to: (a) Control the length of the scan  
with digital switches and counters instead of microswitches, and (b) change the  
density sampling system from a mechanical base to a time base which will allow a  
sampling rate of 10 samples per micrometer (versus the present rate of 1 sample per  
micrometer).

17. SUPPORTING OR RELATED CONTRACTS (Agency & Other)/COORDINATION

This contract will be run concurrently with a contract to modify a stage for the  
1032T Microdensitometer. There is no overlap on these projects. Coordination has  
been performed through EXRAND.

18. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT (Continue on addi-  
tional page if required) The scan controller consisting of decade counters, switches  
and comparison logic will replace the microswitch controls to allow the scan length  
to be preset to from 1 micrometer to 1 decimeter. This precise programming of the  
scan length will eliminate the extraneous data now produced on small scans and will  
reduce costly processing of the data. The sampling system will be modified so that  
it will be triggered by a crystal oscillator (the "clock") instead of directly by  
the stage movement. The oscillator will allow better control of the sampling rate  
and will permit more frequent sampling, thereby reducing the limitations to analyzing  
high resolution imagery.

19. APPROVED BY AND DATE

OFFICE

DEPUTY DIRECTOR

DDCI

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